National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

May 12, 2008

Office of Safety and Mission Assurance

TO: Associate Administrator

FROM: Chairman, NASA National Aviation Operations Monitoring System (NAOMS) Information Release Advisory Panel (2008)

SUBJECT: Recommendation Report of the NAOMS Information Release Advisory Panel (2008)

On behalf of the NASA NAOMS Information Release Advisory Panel (2008), I am pleased to report that our panel has completed a comprehensive review of the actions previously taken by NASA to release NAOMS survey response information to the public and, based on our extensive interviews with stakeholders in this process, has formulated additional strategies for consideration in the next phase of NAOMS information release. A detailed summary of our activities, findings, and recommendations is enclosed.

Our panel's work was observed by Jamal Abbed, NAOMS Information Release Project Director (2008) and Ron Colantonio, NAOMS Information Release Project Manager (2008). The panel also worked in close collaboration with members of the current and former NAOMS information release project teams and other staff and would like to acknowledge and thank the following individuals for their invaluable assistance to the panel: Bryan O'Connor, NAOMS Information Release Review Panel (2007) chairman; Beth Dickey, Office of Public Affairs; Frank Groen and Bill Vesely of the Office of Safety and Mission Assurance; and Herb Schlickenmaier and Jean Wolfe of the Aeronautics Research Mission Directorate.

Throughout the remainder of this calendar year our panel remains at your disposal to answer any questions you might have or to provide any assistance or guidance as required to the NAOMS Information Release Project Team (2008).

Sincerely,

Signature on Original at NASA HQ

_____

Steve Nagel

Panel Concurrence:

Signature on Original at NASA HQ	Signature on Original at NASA HQ	Signature on Original at NASA HQ
_____	_____	_____
Munro Dearing	Eric Raynor	Dan Thomas

Enclosure

Cc:
HQ/Aeronautics Research Mission Directorate/Dr. Shin
Ms. Wolfe
HQ/Office of the Administrator/Ms. Dale
Mr. Morell
HQ/Office of the General Counsel/Mr. Falcon
HQ/Office of Infrastructure and Administration/Mr. Abbed
Ms. Dominguez
Mr. Walker
HQ/Office of Legislative and Intergovernmental Affairs/Ms. Kieffer
HQ/Office of Public Affairs/Ms. Dickey
HQ/Office of Safety and Mission Assurance/Mr. Groen
Mr. O'Connor
Mr. Vesely
ARC/Airfield Management Office/Mr. Williams
ARC/Aviation Safety Program Office/Mr. Smith
ARC/Office of Director of Center Operations/Mr. Braxton
GRC/Center Director/Dr. Whitlow
GRC/NAOMS Information Release Project Manager/Mr. Colantonio
JSC/Aircraft Operations Division/Mr. Finney

FINAL REPORT OF THE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
NATIONAL AVIATION OPERATIONS MONITORING SERVICE (NAOMS)
INFORMATION RELEASE ADVISORY PANEL (2008)

May 12, 2008

Background and Summary of Panel Charter

In a memorandum dated Nov. 19, 2007, the NASA administrator directed the chief of the Office of Safety and Mission Assurance to lead an effort to release as much NAOMS survey information as possible by the end of 2007. This effort is referred to as Phase 1 of the NAOMS information release. The tasking was executed on Dec. 31, 2007, with the posting of NAOMS information on the NASA website. Phase 1 was completed on Feb. 6, 2008, with a more comprehensive web posting of NAOMS information.

After the Phase 1 postings, NASA initiated another review of all the NAOMS survey responses in order to allow for further release of information. To this end, the NAOMS Information Release Advisory Panel (2008) was chartered to make recommendations relating to an additional release of NAOMS information. A project team was selected to implement the recommendations. This effort is referred to as Phase 2 of the NAOMS information release. (See Appendix 1 for appointment letter.)

Specifically, the advisory panel was asked to determine NASA's obligation, if any, to the confidentiality that was promised by the NAOMS team to the survey participants, and to develop a release strategy with the following goals:

- Release the maximum amount of survey information.
- Do not reveal commercial confidential information.
- Meet NASA's obligations to survey participant confidentiality.
- Minimize the threat to participant anonymity.

The advisory panel held its first meeting on Feb. 5, 2008. During the months of February, March and April, the advisory panel -- working closely with the Phase 1 and Phase 2 project team members -- reviewed the NAOMS information, conducted research, met with external organizations and drafted a report with recommendations.

NASA's Obligation to Anonymity and Confidentiality

The full panel met in person during the week of Feb. 20, 2008. The purpose of this meeting was to discuss the methods of further NAOMS information release based on the

panel's charter. Two important points of discussion were to clarify the definitions of anonymity and confidentiality as expressed in the letter sent to all participants. (See Appendix II, *"General Aviation (GA) Introductory Letter."*) In this cover letter, survey participants were told, "Your responses will be completely confidential. They can never be connected to your name." The introductory letters for the air carrier survey used the same wording.

Anonymity

The panel used the following definition of anonymous: not named or identified. (See *Merriam Webster Collegiate Dictionary, 10th Edition*.) Apart from the dictionary, we could find no other federal quantitative standard or working definition. We proceeded with the understanding that NASA's obligation was to protect an individual pilot from being identified.

The surveys did not ask individual participants for names, addresses, phone numbers or other personal information. However, given the high number of individual responses per survey (approximately 300) and the specific time frame provided by each participant (30-, 60- or 90-day survey recall periods) there was a significant risk that an individual pilot could be identified by his or her survey responses.

Confidentiality

The most difficult part of our tasking was determining NASA's obligation of confidentiality to survey participants. We could not find any definition or explanation of the phrase "completely confidential" as used by the NAOMS Project. Further, if a survey participant asked for the meaning of "completely confidential," the NAOMS Project did not have a scripted answer to use.

To find a definition of confidentiality applicable to surveys given by a federal agency, the panel turned to guidance from the Office of Management and Budget (OMB). OMB develops and oversees the implementation of government-wide policies, principles, standards, and guidelines concerning statistical collection procedures and methods. In "*Questions and Answers When Designing Surveys for Information Collections*," OMB provides the following definition of confidentiality:

> In the context of collecting data for statistical and research purposes, an agency pledge of confidentiality "refers broadly to a quality or condition accorded to information as an obligation not to transmit that information to an unauthorized party." [1] (p. 52)

This guidance document also provides the following rationale for protecting confidentiality:

[1] See page 52. http://www.whitehouse.gov/omb/inforeg/pmc_survey_guidance_2006.pdf

> Most important is that the identity of respondents not be revealed, either deliberately or inadvertently, as part of data processing and dissemination. Respondents are more likely to provide information (and in the case of "sensitive topics," the correct information) when they know the data that they provide will be kept confidential by the collecting agency.[2]

Taking the definition of confidentiality together with its rationale, we are left with two elements:

- protection of anonymity, and
- no transmission of information to an unauthorized party.

To amplify the second element of the definition, we found instructive the following guidance for research of human subjects *("Institutional Review Board Guidebook,"* Part III.D, Department of Health and Human Services, Office of Human Research Protections):

> Confidentiality pertains to the treatment of information that an individual has disclosed in a relationship of trust and with the expectation that it will not be divulged to others in ways that are inconsistent with the understanding of the original disclosure without permission. [3]

We concluded that "confidentiality" included a subjective understanding, in this context, between the survey giver (NASA, through the NAOMS Project, through the NAOMS contractor) and the survey participant (the individual pilot). Our question then became: What did pilots believe it meant when they were told that their survey responses would be "completely confidential"? The importance of getting this right was paramount, since breaking that promise could discourage incident reporting to other safety reporting systems, such as the Aviation Safety Reporting System (ASRS) and the Aviation Safety Action Program (ASAP).

To find out what pilots understood when they saw or heard the words "completely confidential," the panel contacted several pilot and aviation industry associations. [4] Their interpretations of "confidentiality" were factored into the development of the Phase 2 release strategies discussed later in this report. (See Appendix III, *"Summary of Discussions with Organizations."*) The information gained from the pilot associations was weighted more heavily since these groups directly represent the pilots who participated in the survey.

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[2] See page 52, ibid

[3] http://www.hhs.gov/ohrp/irb/irb_guidebook.htm

[4] The Panel determined that we could not interview individual survey respondents because the methodology of the survey disconnected a pilot's name from a given survey. Even if able, this would have been a difficult task.

Commercial Confidential Information

Exemption 4 of the Freedom of Information Act protects trade secrets and commercial or financial information obtained from a person that is privileged or confidential. The purpose of this exemption is to protect the government and the submitters of the information.[5] Certain terms in the survey responses could fall under this exemption as information that is:

- Commercial or financial, and
- Obtained from a person, and
- Privileged or confidential.[6]

In the panel's review of the survey responses, we found information that may be protected under this exemption, such as names of airlines and operators, and other information that meets the definition of commercial confidential. In Phase 2, the implementation team should redact commercial confidential information that is protectable under the standards of Exemption 4.

The aviation industry associations interviewed by the panel, in alphabetical order by acronym, included:

- AAAE: American Association of Airport Executives, representing airport management personnel.
- ACI: Airports Council International, representing airport operators.
- ALPA: Air Line Pilots Association, representing commercial air carrier pilots.
- AOPA: Aircraft Owners and Pilots Association, representing general aviation pilots and aircraft owners.
- ATA: Air Transport Association, representing major air carriers.
- CAPA: Coalition of Airline Pilots Association, representing unionized commercial air carrier pilots.
- FSF: Flight Safety Foundation, representing air carriers, manufacturers, suppliers, maintenance organizations, aviation regulatory agencies, flight crewmembers, and air travelers.
- HAI: Helicopter Association International, representing helicopter operators and owners, users, manufacturers and suppliers, and service organizations.
- RAA: Regional Airline Association, representing regional airlines and their suppliers.

The panel invited other groups, including two that represent the traveling public, but they either declined to participate or did not respond to our inquiries.

[5] See, National Parks & Conservation Association v. Morton, 498 F.2d 765, 767-770 (D.C. Cir. 1974).
[6] See, Critical Mass Energy Project v. NRC, 975 F.2d 871, 878 (D.C. Cir. 1992) (en banc).

In general, many of the groups that did respond had low confidence in the survey responses and did not see much value in the dated results, although some did see value in certain parts of the survey, such as the Joint Implementation Measurement Data Analysis Team (JIMDAT) results. The feedback from the members of these organizations was generally minimal, especially after the initial publicity about the NAOMS Project in late October 2007 and after the Phase 1 information release at the end of that year.

Several of the groups stated that instead of releasing individual redacted survey responses, NASA should analyze the information and publish the results. There was a general consensus that if further NAOMS survey responses were released, no names of individuals and air carriers should be revealed. Type and model of aircraft and names of airports could be released unless this information could identify a particular individual, airline or operator. The organizations that responded to us believed that revealing any of these entities would be a violation of the confidentiality that was promised to the survey participants. Some of the organizations suggested using a "rule of three" when considering what information to release. For example, if there were at least three air carriers operating at a given airport, it might be acceptable to mention the name of that airport unless other information along with the airport name would provide identification of an individual, airline or operator. All of these organizations stated that further release of the survey responses would have a detrimental effect on aviation safety reporting. Specifically, the ASRS and ASAP programs could become ineffective in the future.

Phase 2 Release Strategies

In order to develop a release strategy that satisfies the four goals stated in the charter, the NAOMS Information Release Advisory Panel (2008) had to balance conflicting requirements: to release as much information as possible while protecting the anonymity and confidentiality promised to each survey participant. When in doubt about the risk of identification, the panel gave more weight to protecting anonymity and confidentiality, not only because these were promised to the participants, but also to avoid any situation in which pilots refuse to participate in other aviation safety reporting systems. The panel believes that if too much information is released, negative pilot reaction is a real possibility and this could have a negative impact on future aviation safety reporting.

The panel also attempted to use existing guidelines as much as possible. Documents that were referenced included:

- "*Aviation Safety Reporting System Standard Operating Procedures Manual*," Aug. 30, 2007.
- "*Statistical Working Paper #22, Report of Statistical Disclosure Limitation Methodology*." [7]
- "*A Model for the Assessment of Identification Risk*," an internal NASA white paper by Frank Groen.

[7] Federal Committee on Statistical Methodology, Office of Management and Budget, December 2005

Using the information from these documents and what was learned from the discussions with the various organizations detailed above, the advisory panel developed a strategy for the Phase 2 release of NAOMS information.

The NAOMS Project questionnaires consist of two separate surveys, one for air carrier pilots and the other for general aviation pilots. Each survey has four parts with the following titles and content:

- Section A – pilot background
- Section B – safety related events
- Section C – in-close approach changes and JIMDAT for air carrier, and weather related issues for general aviation
- Section D – questionnaire feedback

The specific Phase 2 release strategy consists of three parts: a standalone Section A; Sections B, C, and D broken into subparts with responses from Section A appended; and free text. (See Figure 1, "*Phase 1 and Phase 2 Comparison.*")

Note: A guiding principle in the Phase 2 strategy is to release more information than NASA did in Phase 1 without increasing the risk of identity exposure accepted in Phase 1. The release method in Phase 1 was to redact information based on worst case threat. For example, if releasing names of very small airports posed a threat to pilot anonymity (maybe only a few pilots operate at those airports), then, in the name of expediency and conservatism NASA redacted the names of all airports. In Phase 2 NASA should continue to withhold the names of very small airports, but when naming an airport does not pose a credible risk to pilot, operator or air carrier identity, NASA should release the name of the airport. In this way NASA will release more information without significantly changing the risk posture. To do this effectively, NASA should assess the risk of identity exposure that survey participants, airlines and operators incurred in Phase 1. Each of the recommended Phase 2 strategies will be compared to Phase 1 to determine the relative differences in risk. If the Phase 2 strategies pose greater risk than Phase 1, the NAOMS Implementation Team (2008) will confer with the NAOMS Information Release Advisory Panel (2008) to determine whether the additional risk is acceptable.

<u>Stand Alone Section A</u>

Section A should stand alone from the other sections so that more specific information can be added and still protect the anonymity of the participant. Survey answers should be grouped by year with survey responses randomized within a given year. Appendix IV, "*Redaction Differences - Phase 2 vs. Phase 1,"* details the specific differences in levels of redaction between the two information release phases.

Note: With this addition of content, in order to protect the anonymity of the survey participants, standalone Sections A (for both AC and GA) may need to be broken into subparts, or further generalization of selected responses may be necessary.

Sections B, C, and D Subparts with Responses from Section A Appended

Sections B, C and D should be broken into subparts, each consisting of one survey question or a series of related survey questions. Relevant survey responses from Section A noted above, in a more redacted format, should be appended to each subpart of Sections B, C, or D. Each subpart, along with its appended information from Section A, should be grouped by year with survey responses and arranged randomly within the year. Appendix IV shows the proposed redactions for the Section A responses that will be appended to the subparts. Tables in Appendix V and Appendix VI depict the proposed breakdown of Sections B, C, and D into subparts with their corresponding Section A responses. Appendix VII contains an example of a spreadsheet for a single subpart. A risk assessment should be done for each subpart and appended Section A responses. If the risk is deemed unacceptably high, then it will be necessary to eliminate some of the responses from Section A in the comparisons.

Two reasons for breaking the survey sections into subparts are to allow more information to be appended from Section A and to allow the inclusion of high unique events and numeric rare events as defined in Phase 1's *"NAOMS Survey Response Redaction Summary."* These events should be included unless doing so causes an unacceptable increase in the risk of identity disclosure for a survey participant.

Note: Since the standalone Section A will be randomized independently of the subparts in Sections B, C, and D, none of the subparts will be linkable back to it. Additionally, since the subparts are randomized independently from each other, a given subpart will not be linkable to any other subpart.

Free Text

Free text should be disaggregated from the rest of the survey and randomized, similar to the way this was done in Phase 1. The following guidelines should be used for the free text:

- No personal names should be used, including individuals other than the survey participant. This also was done in Phase 1.
- General position titles may be used (captain, first officer, tower controller, etc.) unless the title is unique to a company or its use could identify the survey participant, airline or operator. The only position titles used in Phase 1 were captain or first officer/others.
- Names of operators and airlines should be redacted. This also was done in Phase 1.

- Names of airports, navigational fixes, or geographic locations may be used unless their use could disclose the identity of the survey participant, airline or operator. Names, fixes and locations were not used in Phase 1.
- Aircraft make and model may be used for an air carrier unless its use could disclose the identity of the survey participant, airline or operator. Makes and models were not used in Phase 1.
- The names of actual aircraft systems may be used instead of Air Transport Association (ATA) codes unless such use could disclose the identity of the survey participant, airline, or operator. Only ATA codes were used in Phase 1.
- Any rare event that could disclose the identity of the survey participant, airline or operator should be redacted. This also was done in Phase 1.

Research Data Center

NASA has engaged the National Research Council of the National Academies to assess the validity of the NAOMS methodology. If the National Research Council validates the methodology, NASA could consider making the NAOMS raw survey responses available to researchers for more detailed analysis. In Phase 2, the implementation team should evaluate whether a research data center is an acceptable option.

Statistical Agency Reviews

The NAOMS Information Release Advisory Panel (2008) sought the advice of federal agencies with experience in handling confidential data. Several agencies indicated a willingness to offer limited assessments of NASA's proposed redaction and risk disclosure analysis methods. A draft version of the advisory panel's recommended release strategies and the NASA white paper, "*A Model for the Assessment of Identification Risk*," were submitted to the following statistical agencies and committee for review and general feedback:

- Bureau of Transportation Statistics, Office of Advanced Studies
- Bureau of Labor and Statistics
- Center for Economic Studies, U.S. Bureau of the Census
- Confidentiality and Data Access Committee

The limited review time permitted only a brief evaluation. Generally speaking, the feedback received to date has encouraged NASA to implement redaction practices outlined in OMB's "*Statistical Working Paper #22, Report of Statistical Disclosure Limitation Methodology*." The advisory panel has reviewed these best practices and has implemented most of them in the Phase 2 release strategy.

Recommendations

Recommendation 1

NASA should assess the disclosure risk from Phase 1 for inferring the identity of a survey participant, operator or airline.

Recommendation 2

The methodology and tools used for the disclosure risk analysis should be consistent with the baseline practices used by other federal statistical agencies.

Note: It is understood that the disclosure probability estimates from this analysis do not provide any absolute level of risk of survey participant identification. There will be uncertainty in the probability estimates due to the particular model selected and the assumptions made. However, a disclosure risk analysis may be beneficial to subjectively assess sensitivities in the proposed redaction strategies and offer a comparative assessment with Phase 1 disclosure risk.

Recommendation 3

Concurrent with the implementation of Recommendation 1, NASA should prepare Phase 2 redacted survey responses using the redaction strategies noted in the "Phase 2 Release Strategies" section of this report and further referenced in appendices IV, V, VI, and VII.

Recommendation 4

After the implementation of Recommendation 3, NASA should perform a risk assessment of the Phase 2 redacted survey responses and suggest further redaction or un-redaction steps. This is to ensure confidentiality and anonymity are sufficiently maintained while maximizing information release.

Note: The level of confidentiality or anonymity disclosure risk should be comparable to that of the Phase 1 redacted survey responses already posted to the public. Therefore, it is recommended that NASA determine the disclosure risk of the Phase 1 released information as a baseline, and the disclosure risk of the proposed Phase 2 redacted survey responses.

Recommendation 5

NASA should establish a panel of subject matter experts (pilots, air traffic managers, aviation safety experts, etc.) to evaluate the Phase 2 redacted survey strategy and responses, in particular the free text, to ensure confidentiality and anonymity are

protected. This panel should be independent of NASA personnel performing the actual survey response redaction and statistical disclosure risk analysis.

Recommendation 6

NASA should package and present Phase 2 redacted survey responses in Microsoft Excel format, in the same fashion as it packaged and presented the Phase 1 redacted survey responses that were posted on Feb. 6, 2008.

Recommendation 7

NASA should document lessons learned from the NAOMS Project as well as from the Phase 1 and 2 redaction efforts, and make them available to all who may derive benefit.

Recommendation 8

NASA should determine whether a research data center (RDC) is an acceptable option for dissemination of NAOMS information.

Note: Specifically, the implementation team should investigate whether NASA has the legal authority needed to protect the information adequately, or whether such a data center could share information based on the authority of another statistical agency. Since the survey responses were collected under pledges of confidentiality and protection of pilot anonymity, conditions must be controlled strictly in order to minimize disclosure risk. This recommendation assumes NASA possesses or can obtain the authority to limit access to NAOMS information for legitimate research purposes only.

Recommendation 9

In the event NASA decides to provide fuller access to the raw NAOMS survey responses, it should convene a team to define the framework and operations of a NAOMS Research Data Center. Access should be limited to groups or individuals qualified to validate and analyze the responses as well as maintain an environment of confidentiality.

Note: The concept of an RDC is a secure facility designed to allow access to confidential agency data by outside researchers. Several statistical federal agencies including the Census Bureau have instituted the concept of an RDC with much success. Access to the NAOMS raw survey responses would be under defined criteria and confidentiality conditions. The RDC could be established within NASA or through sponsorship from a statistical agency already equipped with the infrastructure to share, control and monitor the use of confidential survey responses.

Recommendation 10

NASA should consider requesting statutory authority to protect voluntarily provided safety-related information in the future (such as confidential survey responses and mishap investigation interviews). The Federal Aviation Administration has similar statutory authority, which encourages reporting of aviation safety events in programs such as ASAP.

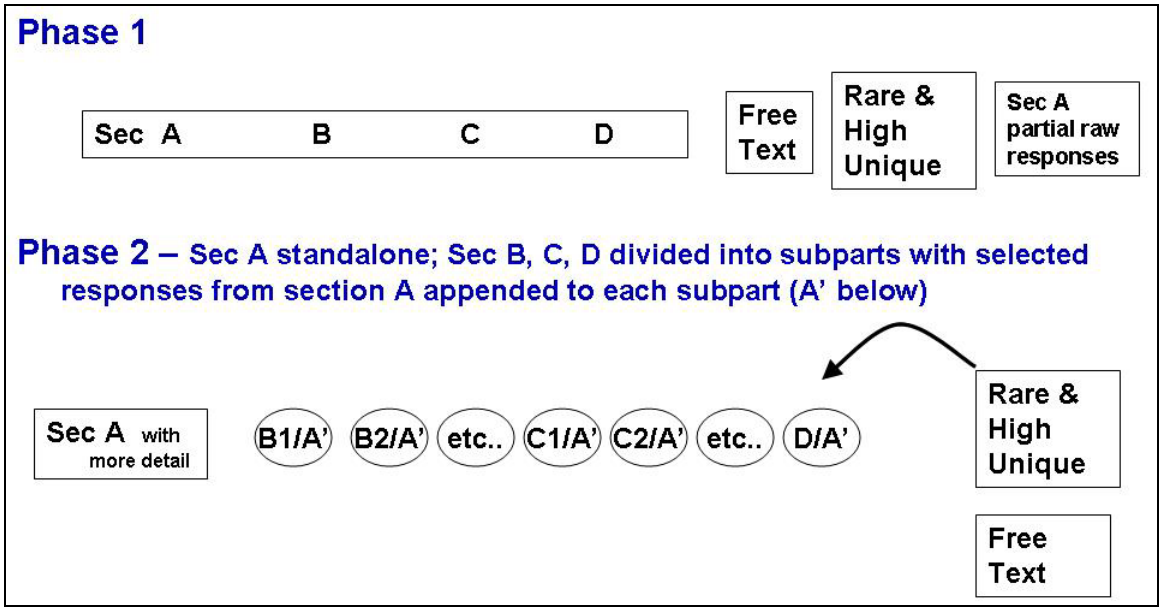
Figure

Appendices

Figure 1

Phase 1 and Phase 2 Comparison

Figure 1 – Phase 1 and Phase 2 Comparison: A top level comparison of the redaction for NAOMS Phase 1 compared to the recommended redaction strategy for Phase 2



Appendix I

Appointment Letter

National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001

April 9, 2008

TO: Chairman, National Aviation Operations Monitoring System (NAOMS) Information Release Advisory Panel (2008)

FROM: Associate Administrator

SUBJECT: Initiation of the NAOMS Information Release Review for Calendar Year 2008

This memorandum initiates a review to consider the format and content relevant to the planned continued public release of survey information gathered as part of the NAOMS Project. You are hereby directed to lead a panel of knowledgeable individuals, not otherwise involved in the NAOMS Project or its associated aviation safety research program, who will conduct the review and advise senior management on the acceptability of the release of survey information.

Consistent with plans we have shared with our Congressional oversight committee, the Administrator has directed that all NAOMS survey responses that do not contain commercial confidential information or information that could compromise the anonymity of individual pilots be released as soon as possible. Following an extensive redaction effort led by Bryan O'Connor of the Office of Safety and Mission Assurance, the initial release of NAOMS information took place on December 31, 2007. That release, in the form of links on the NASA Web site, was subsequently updated and improved until early February 2008.

Because the initial release was done quickly, the process of redaction was necessarily conservative, with a bias toward overprotection of pilot anonymity. I promised Congress that we will take the time in 2008 to optimize the trade between maximum information release and protection of sensitive information. To continue the release of NAOMS information, I have selected a Project Manager, Renato Colantonio of the Glenn Research Center, and a Project Director, Jamal Abbed, assigned to the Office of Safety and Mission Assurance for this task. To aid them in their planning, you will lead a small advisory panel consisting of persons independent of the Aviation Safety Program who are knowledgeable of aviation operations, safety, and law. The nature of the task is important because it addresses NASA's obligations to communicate results of its research to the American public, while at the same time assuring that the pilot community can volunteer information in the future with assurance that confidentiality will be maintained if it has been promised.

The purpose of the panel will be twofold: 1) Determine NASA's obligation, if any, to confidentiality as it was promised by the NAOMS project team to the survey participants and, 2) Develop a release strategy that meets the following goals:

- Release the maximum amount of survey information.
- Do not reveal commercial confidential information.
- Meet NASA's obligations to survey participant confidentiality as determined above.
- Minimize the threat to participant anonymity.

The review panel will be called the NAOMS Information Release Advisory Panel (2008) and will consist of the following members at a minimum:

- Chairman	Steve Nagel, JSC/FCOD
- General Counsel Member	Dan Thomas, HQ/OGC
- Experienced Federal Aviation Administration (FAA) Certified NASA Pilot and Aviation Safety Expert	Munro Dearing, ARC/JO
- Executive Director	Eric Raynor, HQ/OSMA

As panel Chair, you may increase membership as required, and you may call on ad hoc advisors in fields such as survey methodology, statistical analysis, aviation safety reporting systems, Freedom of Information Act, public and legislative affairs, FAA regulations, commercial aircraft operations, or others, to support the panel as needed.

You should work with the NAOMS information release project team, Aeronautics Research Mission Directorate, Aviation Safety Program leaders, the FAA aviation safety organization, and recognized spokespersons for airline pilots, airlines, general aviators, airports, and the flying public to develop a release strategy consistent with the goals I have stated above. Please report your recommendations to me by May 2, 2008. Between May 2, 2008, and December 31, 2008, your panel may be asked to reconvene, as needed, to periodically review the technical approach or output of the NAOMS information release project team.

Upon receipt of your report, and assuming I have no further need for your advice on this matter, the NAOMS Information Release Advisory Panel (2008) will be disbanded.

This memorandum authorizes you to obtain Agency support from any NASA Headquarters office, NASA Center, or program, as required.

Christopher Scolese

Appendix II

GA Introductory Letter

GA INTRODUCTORY LETTER

IHS 262-7

Dear *Participant:*

Aviation safety is a subject of great concern to members of the aviation community. To monitor aviation system safety and safety trends, the National Aeronautics and Space Administration (NASA) has initiated an effort entitled the National Aviation Operations Monitoring Service. NASA is conducting this project to provide reliable safety data for improving aviation safety. I am writing today to ask you, as a pilot, to participate in this exciting project.

NASA has requested the services of Battelle Memorial Institute to conduct surveys of aviation pilots. You have been selected to be interviewed as part of a representative sample of about 8,000 pilots. Your participation and recall of the safety events you have experienced is essential in order for the statistical results of the survey to be valid and useful.

Within a few days, a member of the Battelle interviewing staff will call you to arrange a convenient time to interview you over the telephone. The interview will take 20 to 30 minutes. Your answers will be completely confidential. They can never be connected to your name.

Thank you in advance for your help with this important NASA project. Your participation will further improve safety for you, your colleagues, and the aviation public. **Please call (800) 777-6115 and ask for the codename *Aviation Safety*** to schedule an appointment or answer questions. Questions about your rights as a study subject should be addressed to the Project Managers, listed below.

Sincerely,

Mary M. Connors
NAOMS Co-Project Manager
650-604-6114

Linda J. Connell
NAOMS Co-Project Manager
650-960-6059

Appendix III

Summary of Discussions with Organizations

SUMMARY OF DISCUSSIONS WITH ORGANIZATIONS

- Have you looked at the NAOMS website? If so, any comments?
    - low confidence in NAOMS
    - not since 31 Dec – it was OK
    - low value
    - yes – no reaction
    - yes – cursory look
    - yes – sec C (ICAC and JIMDAT) very good
    - yes – can't believe press is interested
    - no; great concern on breaching anonymity & confid; would destroy trust in aviation community if we "cave in". Why not use ASRS guidelines?

- Any feedback from your members about NAOMS?
    - no
    - a lot in Oct; concern about affect on other safety systems
    - no
    - no
    - no
    - no
    - very sensitive to protecting other safety systems
    - yes – general concerns, what's going on?
    - none

- Possible candidates for unredaction – agree or disagree?
    - Names other than the interviewee
        - All said NO
    - Specific job titles other than interviewee
        - probably OK
        - depends on other identifying info
        - depends on other identifying info
        - general titles OK
        - watch out for corporate unique titles

- OK
- OK
- OK if cannot connect to an individual
- Use pilot flying, pilot monitoring

- Names of airports

  - no
  - watch out for unique city pairs
  - depends on other identifying info
  - OK
  - no, use FAA terminology
  - reluctant to agree to this
  - OK if cannot connect to an individual
  - would have a chilling affect; what is value added? Rule of 3 might be OK

- Names of air carriers

  - no
  - no
  - depends on other identifying info
  - OK
  - no
  - no
  - no
  - no
  - no

- Names of aircraft manufacturers

  - OK
  - could be tied to airline in some cases
  - depends on other identifying info
  - OK
  - watch out for unique manuf/types to a certain airline
  - use type/model (e.g. B-737)
  - use broad categories
  - OK to a point
  - type/model OK

- Type/model/series of aircraft

  - OK
  - could be tied to airline in some cases

        - depends on other identifying info
        - OK
        - watch out for unique manuf/types to a certain airline
        - use type/model (e.g. B-737)
        - use broad categories
        - OK to a point
        - type/model OK

- Other comments:

    - Dangers of releasing raw data, taken out of context
    - Release analysis of surveys
    - Need to protect open reporting culture, non-punitive
    - Don't want to compare airlines by name – which one is safer?
    - Rule of 3's may work
    - Give as little as possible
    - Best would be to analyze the data and present aggregate results
    - Need to worry about protecting the companies/airlines – some are very small
    - If we release too much, could hurt NASA's relationship with industry
    - Should hold our ground and push back
    - Check ASRS redaction criteria – may want to use it
    - NAOMS may have some unique questions that are not in other surveys
    - Can we give them a heads up on which airports might be named?
    - When releasing specific information, ask if it affects safety.
    - None of this should be released to the public

Appendix IV

Redaction Differences

Phase 2 vs. Phase 1

Redaction Differences – Phase 2 vs. Phase 1/Air Carrier

Section A Question	***PHASE 1***	***PHASE 2 – Standalone Section A***	***PHASE 2 – Section A - Subparts***
Reporting period dates	Deletion	Actual length of period	Actual length of period
Calendar quarter, season	Arrange by year, randomize	Arrange by year, randomize	Arrange by year, randomize
Hours per pd (A1)	Generalization, disaggregation/ reordering	Actual	Generalization
Legs per pd (A2)	Disaggregation/ reordering	Actual	Generalization
Legs outside US (A2.1)	Generalization	Generalization	Generalization
Aircraft flown (A3)	Generalization, disaggregation/ reordering	Make/model (1st – 3rd) Phase 1 (4th – 6th)	Aircraft category and propulsion type (1st – 3rd) Phase 1 (4th – 6th)
% hours (A3)	Generalization, disaggregation, reordering	Actual	Generalization
% w/revenue pax (A4)	Generalization	Actual	Generalization
% w/cargo (A5)	Generalization	Actual	Generalization
% w/ no pax or cargo (A6)	Generalization	Actual	Generalization
Crew position A7)	Generalization	Actual	Generalization
Number of aircraft flown by employer (A7.1)	Deletion	Generalization	Generalization
Career hours (A8)	Generalization	Generalization	Generalization

Redaction Differences – Phase 2 vs. Phase 1/General Aviation

Section A Question	***PHASE 1***	***PHASE 2 – Standalone Section A***	***PHASE 2 – Section A - Subparts***
Recall period	Deletion	Actual	Actual
Calendar quarter, season,	Arrange by year, randomize	Arrange by year, randomize	Arrange by year, randomize
ATP or Instrument Rating, IFR current (GA1)	Deletion	Actual	Actual
Lifetime hours (GA2)	Generalization, disaggregation/reordering	Generalization	Generalization
Hours last 60 days, pilot, copilot, all-inclusive (GA3)	Deletion	Generalization	Generalization
Part 121 hours (GA4)	Deletion	Generalization	Deletion
Part 135 hours, fixed wing, helicopter (GA5)	Generalization, disaggregation/reordering, some deletion	Generalization, some deletion	Deletion
Part 91 hours, fixed wing, helicopter (GA6)	Generalization, disaggregation/reordering, some deletion	Generalization, some deletion	Deletion
Part 121 legs (GA7)	Deletion	Generalization	Generalization
Part 135 flights, airplane (GA8)	Generalization, disaggregation/reordering, some deletion	Generalization, some deletion	Generalization, some deletion
Part 135 takeoffs, helicopter (GA9)	Generalization, disaggregation/reordering, some deletion	Generalization, some deletion	Generalization, some deletion
Part 91 takeoffs, airplane (GA10)	Generalization, disaggregation/reordering, some deletion	Generalization, some deletion	Generalization, some deletion
Part 91 takeoffs, helicopter (GA11)	Generalization, disaggregation/reordering, some deletion	Generalization, some deletion	Generalization, some deletion

Section A Question	*PHASE 1*	*PHASE 2 – Standalone Section A*	*PHASE 2 – Section A - Subparts*
Flew as, hours: instructor, student, corporate, business, govt, revenue pax, cargo, patients, recreation, other (GA12A-J)	Deletion	Deletion	Deletion
Make/model (GA13) (1^{st} – 3^{rd})	Partial raw data, disaggregated with % hours flown	Aircraft or helicopter category	Aircraft or helicopter category
Hours flown in type for period (GA13A)	Partial raw data, disaggregated with % hours flown	% hours	Deletion
Number of engines, experimental (GA13B,C)	Deletion	Deletion	Deletion

Appendix V

AC Subset
Breakdown of Air Carrier Sections B, C, and D into Subparts Matched Against Elements from Section A in a Spreadsheet

APPENDIX V - AC Subset - Breakdown of Air Carrier Sections B, C, and D into Subparts Matched Against Elements from Section A in a Spreadsheet												
Section B	**Air Carrier Section A Questions**											
	Reporting Period	***Hours/reporting period (gen)***	***Legs/reporting period (gen)***	***Legs Outside US/reporting period (gen) ****	***Aircraft Category *****	***% with revenue pass (gen)****	***% with cargo (gen) ****	***% no pax or cargo (gen) ****	***Crew Position (gen) ******	***Total carreer Hours (gen)***	***Airline Size (gen)***
1. Diversion: ER1	x	x	x	x	x	x	x	x	x	x	
2. Hazmat/cargo shift: ER2, 2.a, 2.b, 2.c, ER3	x	x		x	x	x	x	x	x	x	
3. Uncommanded surface movement: ER4.a, b, c, d, e, f, g, h, i, ER4i2_1, 2 ,3, 4	x	x			x					x	
4. Fire, smoke, fumes: ER5.a,a.1,b,b.1,c,c.1,d,d.1,e,e.1,f	x	x	x	x	x	x	x	x	x	x	
5. Engine shutdown/failure: ER6, 7	x	x	x		x				x	x	
6. Severe turbulence: TU1, 1a, 1b	x	x	x		x	x			x	x	
7. Wake turbulence: TU2	x	x	x		x	x			x	x	
8. Weather: WE1, 1a, 1b, WE2, 2a	x	x	x						x	x	
9. Divert to alternate: WE3	x	x	x	x					x	x	
10. Airframe icing: WE4	x	x	x	x	x				x	x	
11. Windshear/microburst: WE5, 6	x	x	x	x	x				x	x	
12. Med emer, pax disturbance: CP1, 2, 3	x	x	x	x		x			x	x	
13. Bird Strike: AC1	x	x	x	x	x					x	
14. Near midair: AC2, 3	x	x	x	x	x	x	x	x	x	x	
15. Runway/taxiway excursion: GE1	x	x	x	x	x				x	x	

* only if parameter is 100% in Section A

** only if the aircraft category is the only on given in Section A

*** Only if one crew position given in SectionA

APPENDIX V - AC Subset - Breakdown of Air Carrier Sections B, C, and D into Subparts Matched Against Elements from Section A in a											
Section B	**Air Carrier Section A Questions**										
	Reporting Period	***Hours/reporting period (gen)***	***Legs/reporting period (gen)***	***Legs Outside US/reporting period (gen) ****	***Aircraft Category *****	***% with revenue pass (gen)****	***% with cargo (gen) ****	***% no pax or cargo (gen) ****	***Crew Position (gen) ******	***Total carreer Hours (gen)***	***Airline Size (gen)***
16. Ground conflict: GE2, 2a, 2b, 2c	x	x	x	x	x				x	x	
17. Landing skid: GE3	x	x	x	x	x	x	x	x	x	x	
18. Rejected takeoff: GE4	x	x	x	x	x	x	x	x	x	x	
19. Runway edge excursion/overrun: GE5, 6	x	x	x	x	x	x	x	x	x	x	
20. Runway incursion: GE7	x	x	x	x	x	x	x	x	x	x	
21. Takeoff or landing conflict with other a/c: GE8, 9	x	x	x	x	x	x	x	x	x	x	
22. Ground conflict with aircraft: GE10, 10a, 10b, 10c	x	x	x	x	x	x	x	x	x	x	
23. Used reserve fuel: AH1	x	x	x	x	x	x	x	x	x	x	
24. Accepted clearance/could not comply: AH2	x	x	x	x	x				x	x	
25. Lost sight of a/c: AH3, 3a	x	x	x	x	x				x	x	
26. Land/takeoff w/o clearance: AH4, 5	x	x	x	x	x				x	x	
27. Track deviation: AH6	x	x	x		x	x	x	x	x	x	
28. Tail strike takeoff or landing: AH7, 8	x	x	x	x	x	x	x	x	x	x	
29. Hard landing: AH9	x	x	x	x	x	x	x	x	x	x	
30. Out of CG, overweight takeoff, improper config: AH10, 11, 12	x	x	x	x	x	x	x	x	x	x	

* only if parameter is 100% in Section A

** only if the aircraft category is the only on given in Section A

*** Only if one crew position given in SectionA

APPENDIX V -A C Subset -B reakdown of Air Carrier Sections B, C, and D into Subparts Matched Against Elements from Section A in a											
Section B	**Air Carrier Section A Questions**										
	Reporting Period	***Hours/reporting period (gen)***	***Legs/reporting period (gen)***	***Legs Outside US/reporting period (gen) ****	***Aircraft Category *****	***% with revenue pass (gen)****	***% with cargo (gen) ****	***% no pax or cargo (gen) ****	***Crew Position (gen) ******	***Total carreer Hours (gen)***	***Airline Size (gen)***
31. Unusual attitude, stall warning: AH13, 14	x	x	x	x	x				x	x	
32. Near collision with terrain: AH15, 15a, 15b, 15c, 15c.1	x	x	x	x					x	x	
33. Altitude deviation, descent below MDA: AD1, 1a, 2	x	x	x	x					x	x	
34. Unable time critical comm with ATC: AT1, 1a, 1b, 1c	x	x	x	x					x	x	
35. Rushed approach due to ATC: AT2	x	x	x	x	x	x	x	x	x	x	
Section C- ICAC		x	x	x	x	x	x	x	x	x	
Section C-JIMDAT											
1. GPWS/EGPWS questions: JD1, 1a 1b, 1c, 1d, 1e, 1f, JD2, 2a, 2b	x	x	x	x					x	x	
2. MSAW questions: JD3, 3a, 3b, 3b.1	x	x	x	x					x	x	
3. Non-precision app: JD4, 4a, JD5	x	x	x	x					x	x	
4. Constant angle apps: JD6, 6a, JD7, 7a	x	x	x	x					x	x	

* only if parameter is 100% in Section A

** only if the aircraft category is the only on given in Section A

*** Only if one crew position given in Section A

APPENDIX V - AC Subset - Breakdown of Air Carrier Sections B, C, and D into Subparts Matched Against Elements from Section A in a											
Section B	**Air Carrier Section A Questions**										
	Reporting Period	***Hours/reporting period (gen)***	***Legs/reporting period (gen)***	***Legs Outside US/reporting period (gen) ****	***Aircraft Category *****	***% with revenue pass (gen)****	***% with cargo (gen) ****	***% no pax or cargo (gen) ****	***Crew Position (gen) ******	***Total carreer Hours (gen)***	***Airline Size (gen)***
5. LNAV/VNAV: JD8, 8a, 8a.1, 8b, 8b.1	x	x	x	x					x	x	
6. RNP: JD9, 9a, 9b, 9c, 9c.1	x	x	x	x					x	x	
7. DME: JD10, 10a, JD11, 11a	x	x	x	x					x	x	
8. VASI/PAPI: JD12, 12a	x	x	x	x					x	x	
9. SOP: JD13, 14, 15, 16, 17, 18, 19	x	x	x	x					x	x	
10. Recurrent training: JD20.MONTH, JD20.YEAR (need to redact?)	x	x	x	x					x	x	
Section D	x	x	x						x	x	

* only if parameter is 100% in Section A

** only if the aircraft category is the only on given in Section A

*** Only if one crew position given in SectionA

Appendix VI

GA Subset – Breakdown of General Aviation Sections B, C, and D into Subparts Matched Against Elements from Section A in a Spreadsheet

APPENDIX VI - GA Subset - Breakdown of General Aviation Sections B, C, and D into Subparts								
Section B - Safety Related Events	**General Aviation Survey - Section A Questions**							
	Reporting Period	*ATP or Instrument Rating*	*IFR Current*	*Total Hours (generalized)*	*Hours/reporting period (Part 121, 135, 91) (generalized)*	*Legs/reporting period Part 121 (generalized) **	*Takeoffs/reporting period Part 135, 91 (generalized) **	*Airplane or Helicopter Category ***
1. Diversion: GER1	x			x	x	x	x	x
2.Uncommanded surface movement: GER2-AA - AG	x			x	x	x	x	x
3. Uncommanded surface movement: GER2-HA - HG	x			x	x	x	x	x
4. Fire, smoke, fumes: GER3.A - E	x			x	x	x	x	x
5. Engine shutdown/failure: GER4, 5	x			x	x	x	x	x
6. Total loss of electrical power: GER6	x			x	x	x	x	x
7. Bogus parts: GER7	x			x	x	x	x	x
8. Doors, cowlings opened inadvertently inflight: GER8	x			x	x	x	x	x
9. Door or window came off inflight: GER9	x			x	x	x	x	x
10. Cargo loose or shifted: GER10	x			x	x	x	x	x
11. Contaminated fuel: GER11	x			x	x	x	x	x
12. Wrong type of fuel: GER12	x			x	x	x	x	x
13. Attitude Indicator failure: GER13	x			x	x	x	x	x
14. Severe turbulence: GTU1, A - C	x			x	x	x	x	x
15. Wake turbulence >45 deg roll: GTU2	x			x	x	x	x	x
16. Weather info: GWE1, A - E	x			x	x	x	x	x
17. Weather divert: GWE2-A, H	x			x	x	x	x	x
18. Icing: GW E3-A, H	x			x	x	x	x	x
19. Windshear/microburst: GWE4	x			x	x	x	x	x
20. Loss of tail rotor effectiveness: GWE5-H, 6-H	x			x	x	x	x	x

* Only if 100% in Section A

** Aircraft type is sometimes asked with the specific question. If not, must be only one category specified in Section A

APPENDIX VI - GA Subset - Breakdown of General Aviation Sections B, C, and D into Subparts								
Section B - Safety Related Events	**General Aviation Survey - Section A Questions**							
	Reporting Period	***ATP or Instrument Rating***	***IFR Current***	***Total Hours (generalized)***	***Hours/reporting period (Part 121, 135, 91)(generalized)***	***Legs/reporting period Part 121 (generalized)****	***Takeoffs/reporting period Part 135, 91 (generalized)****	***Airplane or Helicopter Category***
21. Loss of horizon: GWE7-H	x			x	x	x	x	x
22. Distracted by pax: GCP1				x	x	x	x	x
23. Bird strike: GAC1	x			x	x	x	x	x
24. Near midair collision: GAC2, 3	x			x	x	x	x	x
25.Lack of wind indicator: GGE1	x			x	x	x	x	x
26. Takeoff with protective gear: GGE2	x	x		x	x	x	x	x
27. Aborted takeoff: GGE3	x	x		x	x	x	x	x
28. Off edge of runway, taxiway, while taxiing: GGE4-A	x	x		x	x	x	x	x
29. Off edge of runway during takeoff or landing: GGE5-A	x	x		x	x	x	x	x
30. Off end of runway: GGE6-A	x	x		x	x	x	x	x
31. Runway incursion: GGE7-A	x	x		x	x	x	x	x
32. Begin takeoff w/other aircraft on runway: GGE8-A	x	x		x	x	x	x	x
33. Land with other aircraft on runway: GGE9-A	x	x		x	x	x	x	x
34. Hit runway or taxiway light: GGE10-A	x	x		x	x	x	x	x
35. Hit animal: GGE11	x			x	x	x	x	x
36. Collide with ground vehicle: GGE12-A, A -C	x	x		x	x	x	x	x
36. Collide with ground vehicle: GGE13-H, A -C	x	x		x	x	x	x	x
37. Near ground collision: GGE14-A, A - C	x	x		x	x	x	x	x

* Only if 100% in Section A

** Aircraft type is sometimes asked with the specific question. If not, must be only one category specified in Section A

APPENDIX VI - GA Subset - Breakdown of General Aviation Sections B, C, and D into Subparts								
Section B - Safety Related Events	**General Aviation Survey - Section A Questions**							
	Reporting Period	*ATP or Instrument Rating*	*IFR Current*	*Total Hours (generalized)*	*Hours/reporting period (Part 121, 135, 91) (generalized)*	*Legs/reporting period Part 121 (generalized) **	*Takeoffs/reporting period Part 135, 91 (generalized) **	*Airplane or Helicopter Category ***
39. Use reserve fuel: GAH1	x	x	x	x	x	x	x	x
40. Accept clearance could not comply with: GAH2	x	x	x	x	x	x	x	x
41. Lose sight of aircraft: GAH3, A	x	x	x	x	x	x	x	x
42. Land w/o clearance: GAH4	x	x		x	x	x	x	x
43. Takeoff w/o clearance: GAH5	x	x		x	x	x	x	x
44. Deviation from route or vector: GAH6	x	x	x	x	x	x	x	x
45. Takeoff w/CG out of limits: GAH7	x	x		x	x	x	x	x
46. Takeoff overweight: GAH8	x	x		x	x	x	x	x
47. Takeoff w/improper config: GAH9-A	x	x		x	x	x	x	x
48. Unusual attitude: GAH10	x	x	x	x	x	x	x	x
49. Low rotor RPM: GAH11-H	x	x		x	x	x	x	x
50. Stall warning/stick shaker: GAH11-A	x	x		x	x	x	x	x
51. Near collision/ground: GAH12, A - C	x	x		x	x	x	x	x
52. Cross thld w/gear up: GAH13-A, A	x	x		x	x	x	x	x
53. Enter airspace w/o clearance: GAH14	x	x	x	x	x	x	x	x
54. Lose horizon: GAH15	x	x	x	x	x	x	x	x
55. Altitude deviation: GAD1	x	x	x	x	x	x	x	x
56. Descend below MSA: GAD2	x	x	x	x	x	x	x	x
57. Unable to comm w/ATC: GAT1, A - C	x	x		x	x	x	x	
58. High alt or a/s: GAT2	x	x	x	x	x	x	x	x
59. Leave freq for wx: GAT3	x	x	x	x	x	x	x	
60. Miss transmission: GAT4, A, B, B.1	x	x		x	x	x	x	
61. NOTAMS: GAT5	x	x		x	x	x	x	

* Only if 100% in Section A

** Aircraft type is sometimes asked with the specific question. If not, must be only one category specified in Section A

APPENDIX VI - GA Subset - Breakdown of General Aviation Sections B, C, and D into Subparts								
Section B - Safety Related Events	**General Aviation Survey - Section A Questions**							
	Reporting Period	*ATP or Instrument Rating*	*IFR Current*	*Total Hours (generalized)*	*Hours/reporting period (Part 121, 135, 91) (generalized)*	*Legs/reporting period Part 121 (generalized) **	*Takeoffs/reporting period Part 135, 91 (generalized) **	*Airplane or Helicopter Category ***
Weather Planning								
1. Wx info source: GC1, A1 - 7	x	x		x	x	x	x	
2. WX info source, most recent: GC2, A - C	x	x		x	x	x	x	
3. VFR takeoffs: GC4	x	x		x	x	x	x	
4. VFR flight mins: GC5, A, B	x	x		x	x	x	x	
5. Lost due to wx: GC6, A	x	x	x	x	x	x	x	x
6. Spatial disorientation: GC7, A, B	x	x	x	x	x	x	x	x
7. Inadvertent IMC: GC8, A, B	x	x	x	x	x	x	x	x
8. Go-around: GC9, A, B	x	x		x	x	x	x	x
9. Weather divert: GC10, A	x	x	x	x	x	x	x	x
10. VFR on top: GC11, A	x	x	x	x	x	x	x	x
11. Hours instrument tng: GC12	x	x	x	x	x	x	x	x
12. Hours actual inst. Tng: GC13	x	x	x	x	x	x	x	x
13. How long ago (yrs, mos, days): GC14	x	x	x	x	x	x	x	x
14. IFR flight plans: GC15, A	x	x	x	x	x	x	x	
15. IFR x mins: GC16, A, B	x	x	x	x	x	x	x	
16. Aircraft equipment for IFR: GC17A -C	x	x	x	x	x	x	x	x
17. Instrument approaches flown: GC18, A - C	x	x	x	x	x	x	x	x
18. Instrument Part 91: GC19	x	x	x	x	x	x	x	
19. FAR Part 91: GC20A - D	x	x	x	x	x	x	x	
Section D: Questionnaire Feedback								
1. All: GD1 - 4	x							

* Only if 100% in Section A

** Aircraft type is sometimes asked with the specific question. If not, must be only one category specified in Section A

Appendix VII

Example Subpart Spreadsheet

APPENDIX VII - Example Subpart Spreadsheet										
CY 2003	EXAMPLE ONLY; FICTIONAL DATA					Air Carrier Section A Questions				
Survey Respondent Number (randomized within the year	Engine Shutdown/ Failure: ER6, 7	Reporting Period	Hours/ reporting period (gen)	Legs/ reporting period (gen)	Legs Outside US/ reporting period (gen)	Aircraft Category	Passenger or cargo/ other (gen)	Crew Position (gen)	Total career Hours (gen)	Number of Aircraft in Company (gen)
1	1	60 days	51 - 90	16 - 30	< 5	Medium/ turbofan	Passenger	Captain	Medium	> 150
2		60 days	91 - 130	31 - 50	< 5	Large/ turbofan	Passenger	FO/oth	Low	< 150
3		60 days	51 - 90	16 - 30	< 5	Medium/	Passenger	Captain	High	< 150
4		60 days	51 - 90	16 - 30	< 5	Medium/ turbofan	Passenger	Captain	Medium	> 150
5	2	60 days	91 - 130	31 - 50	< 5	Large/ turbofan	Passenger	FO/oth	Low	> 150
……		60 days	91 - 130	31 - 50	< 5	Medium/ turbofan	Cargo/other	FO/oth	Medium	< 150
25,000		60 days	51 - 90	16 - 50	< 5	Large/ turbofan	Passenger	Captain	High	< 150